

## CLAIMS

1. A process for preparing a peracid or diacylperoxide, characterized in that a  
mixed anhydride of formula  $R^1[C(O)OC(O)OR^2]_n$  or  $[R^3C(O)OC(O)O]_pR^4$  is  
5 contacted with a hydroperoxide of formula  $R^5[OOH]_m$  in the presence of a  
base, wherein  
 $R^1$  represents a mono-, di-, tri- or tetrasubstituted  $C_1$ - $C_{19}$  hydrocarbon group,  
optionally containing one or more hetero atoms,  
 $n$  is 1-4,  
10  $R^2$  represents a  $C_1$ - $C_{20}$  hydrocarbon group, optionally containing one or  
more hetero atoms,  
 $R^3$  represents a  $C_1$ - $C_{19}$  hydrocarbon group, optionally containing one or  
more hetero atoms,  
 $R^4$  represents a di-, tri- or tetrasubstituted  $C_1$ - $C_{20}$  hydrocarbon group,  
15 optionally containing one or more hetero atoms,  
 $p$  is 2-4,  
 $R^5$  represents hydrogen or a mono- or disubstituted  $C_3$ - $C_{18}$  tertiary alkyl or  
 $C_2$ - $C_{20}$  acyl group, in which the tertiary alkyl or acyl group may optionally  
contain one or more hetero atoms,  
20  $m$  is 1 or 2, and  
if  $R^5$  represents hydrogen,  $m$  is 1,  
provided that if the hydroperoxide is an  $\alpha,\alpha'$ -dihydroperoxyperoxide, the  
reaction is not carried out in an inert two-phase solvent system comprising a  
polar solvent and an apolar solvent.  
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2. A process according to claim 1, characterized in that  $n$  is 1 or 2.
3. A process according to claim 1, characterized in that  $R^1$  and  $R^3$   
independently represents a linear or branched  $C_4$ - $C_{12}$  alkyl or  $C_6$ - $C_{12}$  aryl  
30 group, said alkyl and aryl groups optionally being substituted with a hydroxy  
group, a linear or branched  $C_1$ - $C_4$  alkyl group or a halogen atom.

4. A process according to claim 1, characterized in that  $R^2$  represents a  $C_3$ - $C_8$  alkyl group or a  $C_6$ - $C_{12}$  aryl group.
5. A process according to claim 1, characterized in that a mixed anhydride of formula  $R^1[C(O)OC(O)OR^2]_n$  is used.
6. A process according to claim 1, characterized in that  $R^5$  represents hydrogen or a monovalent  $C_3$ - $C_{18}$  tertiary alkyl group.
7. A process according to claim 1, characterized in that the base is an alkali metal hydroxide.
8. A process according to claim 1, characterized in that the reaction is carried out at a pH of 5 or higher.
9. A process according to claim 1, characterized in that the reaction is carried out in the absence of an organic solvent.
10. A process according to claim 1, characterized in that the mixed anhydride is prepared by contacting a carboxylic acid of formula  $R^1[C(O)OH]_n$  with a halogen formate of formula  $XC(O)OR^2$  or  $[XC(O)O]_pR^4$  in the presence of a base in an aqueous medium, wherein  $R^1$ ,  $R^2$ ,  $R^4$ ,  $n$ , and  $p$  have the same meaning as defined in claim 1 and  $X$  is a halogen atom.
11. A process according to claim 10, characterized in that a quaternary ammonium phase transfer or tertiary amine catalyst is present.
12. A hydroxydiacylperoxide obtainable by the process according to claim 1 wherein  $R^1$  or  $R^3$  represents a  $C_1$ - $C_{19}$  hydrocarbon group, optionally containing one or more hetero atoms, substituted with a hydroxy group,  $n$ ,

5  $R^2$ ,  $R^4$ , and  $p$  have the meaning defined above,  $R^5$  represents hydrogen or a mono- or divalent  $C_2$ -  $C_{20}$  acyl group, said acyl group optionally containing one or more hetero atoms, said acyl group optionally substituted with a hydroxy group, and  $m$  is 1 or 2, with the exception of benzoyl hydroxyacetyl peroxide, with the proviso that said hydroxydiacylperoxide does not contain a hydroxyphenyl moiety .

10 13. Use of a hydroxyperoxide according to Claim 1 in bleaching, oxidation, epoxidation, chain transfer, radical (co)polymerization, or (co)polymer modification reactions.

14. Use of a hydroperoxide according to Claim 1 in the preparation of poly(meth)acrylates.

15 15. A hydroxyperacid obtainable by the process according to claim 12 wherein  $R^1$  or  $R^3$  represents a  $C_1$ - $C_{19}$  hydrocarbon group, optionally containing one or more hetero atoms, substituted with a hydroxy group,  $n$ ,  $R^2$ ,  $R^4$ , and  $p$  have the meaning defined above,  $R^5$  represents hydrogen, and  $m$  is 1.

20 16. Use of a hydroxyperoxide according to Claim 13 in bleaching, oxidation, epoxidation, chain transfer, radical (co)polymerization, or (co)polymer modification reactions.